CLAIMS

1. A high strength stainless steel pipe for use in oil wells, which has superior corrosion resistance, comprising on a mass percent basis:

0.005% to 0.05% of C;

0.05% to 0.5% of Si;

0.2% to 1.8% of Mn;

0.03% or less of P;

0.005% or less of S;

15.5% to 18% of Cr;

1.5% to 5% of Ni;

1% to 3.5% of Mo;

0.02% to 0.2% of V;

0.01% to 0.15% of N;

0.006% or less of O; and

the balance being Fe and unavoidable impurities,

wherein the following equations (1) and (2) are satisfied

$$Cr+0.65Ni+0.6Mo+0.55Cu-20C\geq 19.5 \quad (1)$$

$$Cr+Mo+0.3Si-43.5C-0.4Mn-Ni-0.3Cu-9N\geq 11.5 \quad (2)$$

where Cr, Ni, Mo, Cu, C, Si, Mn, and N represent the respective contents on a mass percent basis.

2. The high strength stainless steel pipe for use in oil wells, according to Claim 1, further comprising 0.002% to 0.05% of Al on a mass percent basis.

3. The high strength stainless steel pipe for use in oil wells, according to Claim 1 or 2, wherein the content of C is in the range of 0.03% to 0.05% on a mass percent basis.

4. The high strength stainless steel pipe for use in oil wells, according to one of Claims 1 to 3, wherein the content of Cr is in the range of 16.6% to less than 18% on a mass percent basis.

5. The high strength stainless steel pipe for use in oil wells, according to one of Claims 1 to 4, wherein the content of Mo is in the range of 2% to 3.5% on a mass percent basis.

6. The high strength stainless steel pipe for use in oil wells, according to one of Claims 1 to 5, further comprising 0.5% to 3.5% of Cu on a mass percent basis.

7. The high strength stainless steel pipe for use in oil wells, according to Claim 6, wherein the content of Cu is in the range of 0.5% to 1.14% on a mass percent basis.

8. The high strength stainless steel pipe for use in oil wells, according to one of Claims 1 to 7, further comprising at least one selected from 0.03% to 0.2% of Nb, 0.03% to 0.3% of Ti, 0.03% to 0.2% of Zr, 0.2% to 3% of W, and 0.0005% to 0.01% of B on a mass percent basis.

9. The high strength stainless steel pipe for use in oil wells, according to one of Claims 1 to 8, further comprising 0.0005% to 0.01% of Ca on a mass percent basis.

10. The high strength stainless steel pipe for use in oil wells, according to one of Claims 1 to 9, wherein the stainless steel pipe has a texture containing a martensite phase as a primary phase and a ferrite phase at a volume fraction of 10% to 60%.

11. The high strength stainless steel pipe for use in oil wells, according to Claim 10, wherein the ferrite phase has a volume fraction of 15% to 50%.

12. The high strength stainless steel pipe for use in oil wells, according to Claim 10 or 11, wherein the texture further contains an austenite phase at a volume fraction of 30% or less.

13. A method for manufacturing a high strength stainless steel pipe for use in oil wells having superior corrosion resistance, comprising the steps of: preparing a steel pipe raw material which contains on a mass percent basis,

0.005% to 0.05% of C;

0.05% to 0.5% of Si;

0.2% to 1.8% of Mn;

0.03% or less of P;

0.005% or less of S;

15.5% to 18% of Cr;

1.5% to 5% of Ni;

1% to 3.5% of Mo;

0.02% to 0.2% of V;

0.01% to 0.15% of N;

0.006% or less of O; and

the balance being Fe and unavoidable impurities, and which satisfies the following equations (1) and (2); making a steel pipe having a predetermined dimension from the steel pipe raw material; and performing quenching-tempering treatment for the steel pile, in which the steel pipe is reheated to a temperature of 850°C or more, is then cooled to 100°C or less at a cooling rate faster than that of air cooling, and is again heated to a temperature of 700°C or less, the equations being

$$Cr+0.65Ni+0.6Mo+0.55Cu-20C\geq 19.5 \quad (1)$$

$$Cr+Mo+0.3Si-43.5C-0.4Mn-Ni-0.3Cu-9N\geq 11.5 \quad (2)$$

where Cr, Ni, Mo, Cu, C, Si, Mn, and N represent the respective contents on a mass percent basis.

14. The method for manufacturing a high strength stainless steel pipe for use in oil wells, according to Claim 13, wherein pipe-making is performed by hot working while the steel pipe raw material is heated, and cooling is then performed to room temperature at a cooling rate faster than that of air cooling so as to form the seamless steel pipe having a predetermined dimension, followed by the above quenching-tempering treatment.

15. The method for manufacturing a high strength stainless steel pipe for use in oil wells, according to Claim 13 or 14, wherein, instead of the above quenching-tempering treatment, tempering treatment is performed by heating the steel pipe to a temperature of 700°C or less.

16. The method for manufacturing a high strength stainless steel pipe for use in oil wells, according to one of Claims 13 to 15, wherein the steel pipe raw material further contains 0.002% to 0.05% of Al on a mass percent basis.

17. The method for manufacturing a high strength stainless steel pipe for use in oil wells, according to one of Claims 13 to 16, wherein the content of C is in the range of 0.03% to 0.05%.

18. The method for manufacturing a high strength stainless steel pipe for use in oil wells, according to one of Claims 13 to 17, wherein the content of Cr is in the range of 16.6% to less than 18%.

19. The method for manufacturing a high strength stainless steel pipe for use in oil wells, according to one of Claims 13 to 18, wherein the content of Mo is in the range of 2% to 3.5% on a mass percent basis.

20. The method for manufacturing a high strength stainless steel pipe for use in oil wells, according to one of Claims 13 to 19, wherein the steel pipe raw material further contains 0.5% to 3.5% of Cu on a mass percent basis.

21. The method for manufacturing a high strength stainless steel pipe for use in oil wells, according to Claim 20, wherein the content of Cu is in the range of 0.5% to 1.14% on a mass percent basis.

22. The method for manufacturing a high strength stainless steel pipe for use in oil wells, according to one of Claims 13 to 21, wherein the steel-pipe raw material further contains on a mass percent basis at least one of 0.03% to 0.2% of Nb, 0.03% to 0.3% of Ti, 0.03% to 0.2% of Zr, 0.2% to 3% of W, and 0.0005% to 0.01% of B.

23. The method for manufacturing a high strength stainless steel pipe for use in oil wells, according to one of Claims 13 to 22, wherein the steel pipe raw material further contains 0.0005% to 0.01% of Ca on a mass percent basis.